ANNUAL REPORT FOR 2002

White's Store Mitigation Site

Dare County

Project No. 8.T051401

TIP No. R-2551WM

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North Carolina Department of Transportation
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SUMMARY

The following report summarizes the monitoring activities that have occurred in the past year at the White's Store Mitigation Site. The site was constructed and originally planted in May 2001 and was designed as saw grass marsh restoration. The site serves as mitigation entirely for impacts associated with construction of US 64-264.

Two hydrologic monitoring gauges were installed on the site in March 2002. The gauges must show site inundation or saturation within 12 inches of the surface for at least 12.5% of the growing season, as per federal guidelines. Following the first full growing season of monitoring, the site indicates initial hydrologic success, as both gauges showed saturation for at least 20% of the growing season.

Following initial vegetation failure, the site was replanted in May 2002. Success guidelines for the site state that at least 50% of the individual plants must survive after five years and that at the planted species must show a minimum of 75% aerial coverage of the site. Monitoring in August 2002 indicated that minimal planted vegetation was surviving; thus no exact values of percent cover and frequency were calculated. The site will be re-evaluated and is scheduled to be replanted in 2003.

Based on the monitoring results for this growing season, NCDOT proposes to continue hydrologic monitoring and to restart vegetation monitoring following replanting of the site.

1.0 INTRODUCTION

1.1 Project Description

The White's Store Wetland Mitigation Site is located west of Manns Harbor in Dare County (Figure 1). Built in early 2002, the site serves as mitigation for impacts associated with US 64-264 construction (USACE Action ID No. 199502334). The site is designed to serve as 1.4 acres of saw grass marsh mitigation.

1.2 Purpose

In order to demonstrate successful mitigation, hydrologic and vegetative monitoring must be conducted for a minimum of five years or until success criteria are fulfilled. Success criteria are based on federal guidelines for wetland mitigation. These guidelines stipulate criteria for both hydrologic conditions and vegetation survival. The following report details the results of hydrologic and vegetative monitoring during 2002 at the White's Store Mitigation Site.

Activities in 2002 reflect the first year of monitoring at the mitigation site. Included in this report are analyses of both hydrologic and vegetative monitoring results as well as local climate conditions throughout the growing season.

1.3 Project History

May 2001	Site Constructed
May 2001	Site Planted
August 2001	Vegetation Monitoring (1 yr.)
March 2002	Monitoring Gauges Installed
March - November 2002	Hydrologic Monitoring (1 yr.)
May 2002	Site Replanted
August 2002	Vegetation Monitoring (1 yr. restart)
November 2002	Site Treated for Phragmites

1.4 Debit Ledger

The site is designed to serve as mitigation entirely for US 64-264 construction, Project TIP Nos. R-2551, State Project No. 8.T051401. The 1.4-acre saw grass marsh restoration site serves as mitigation for 0.21 acres of impacts due to US 64-264 construction.

Figure 1. Site Location Map

2.0 HYDROLOGY

2.1 Success Criteria

In accordance with federal guidelines for wetland mitigation, the success criteria for hydrology states that the area must be inundated or saturated (within 12 inches of the surface) by surface or ground water for at least 12.5% of the growing season. Areas inundated less than 5% of the growing season are always classified as non-wetlands. Areas inundated between 5% - 12.5% of the growing season can be classified as wetlands depending upon other factors, such as the presence of wetland vegetation and hydric soils. Hydrologic monitoring is to be conducted for 5 years.

The growing season in Dare County begins March 13 and ends November 25. The dates correspond to a 50% probability that temperatures will drop to 28^{o} F or lower after March 13 and before November 25.[1] The growing season is 258 days; therefore the optimum duration for wetland hydrology is 32 days. Also, local climate (represented here by local rainfall totals) must represent average conditions for the area. The site is to be monitored for five years.

2.2 Hydrologic Description

The site was constructed by grading to a natural wetland elevation in order to replicate the hydrology of adjacent emergent communities that are also used as a reference ecosystem. Groundwater and rainfall are the primary hydrologic influences for the site.

Two groundwater gauges monitor water levels on the site. Since no rain gauge was installed on the site, rainfall measured at the nearby Mashoes Road Mitigation Site is included on the final groundwater measurement plots to see how the site responds to individual rainfall events. The vegetation plot map included in Appendix B contains the locations of the two site groundwater gauges.

[1] Natural Resources Conservation Service, Soil Survey of Dare County, North Carolina, p.69.

2.3 Results of Hydrologic Monitoring

2.3.1 Site Data

Table 1 presents the hydrologic monitoring results for both of the gauges. The results indicate that both gauges show jurisdictional hydrologic success by showing saturation within 12 inches of the surface for more than a consecutive 12.5% of the growing season.

Appendix A contains a plot of the groundwater depth for each monitoring gauge. The maximum number of consecutive days that the gauge met success above this 12-inch depth is noted on each graph. Precipitation events are included on each graph as bars.

Table 1. 2002 Hydrologic Monitoring Results

Monitoring Gauge	< 5% (<13 dy)	5 - 8% (13-20 dy)	8 – 12.5% (21-32 dy)	> 12.5% (>32 dy)	Actual Consecutive %	Dates Meeting Success
WS-1				✓	20.9%	10/3-12/11
WS-2				✓	53.5%	7/11-12/11

Gauge problems: A dead battery in WS-2 caused a loss in data for that location from May – July 2002.

2.3.2 Climatic Data

Figure 2 represents an examination of the local climate in comparison with historical data in order to determine whether 2002 was “average” in terms of climate conditions. The figure compares the rainfall from 2002 with that of historical rainfall (data collected between 1971 and 2002). All rainfall data was collected from the NC State Climate Office. The graph includes monthly rainfall totals from November 2001 through July 2002. Information from the Manteo Airport for the months of August through December was not available at the time of this report. The actual totals from the Manteo Airport rain gauge, if available, will be included in the 2003 report.

According to the data recorded at the Manteo Airport, the first half of 2002 saw less rainfall than normal. February, April, May and June experienced below average rainfall. November and December 2001, two critical months during the normal wet season, also experienced well below normal rainfall. The month of January recorded average rainfall for the site. Only the months of March and July experienced above average rainfall.

2.4 Conclusions

Based on both the data recorded by the onsite groundwater monitoring gauges and the area rainfall data, the site meets jurisdictional success criteria while experiencing less than average rainfall conditions. Thus groundwater input is providing adequate hydrology for the site. NCDOT will continue hydrologic monitoring in 2003.

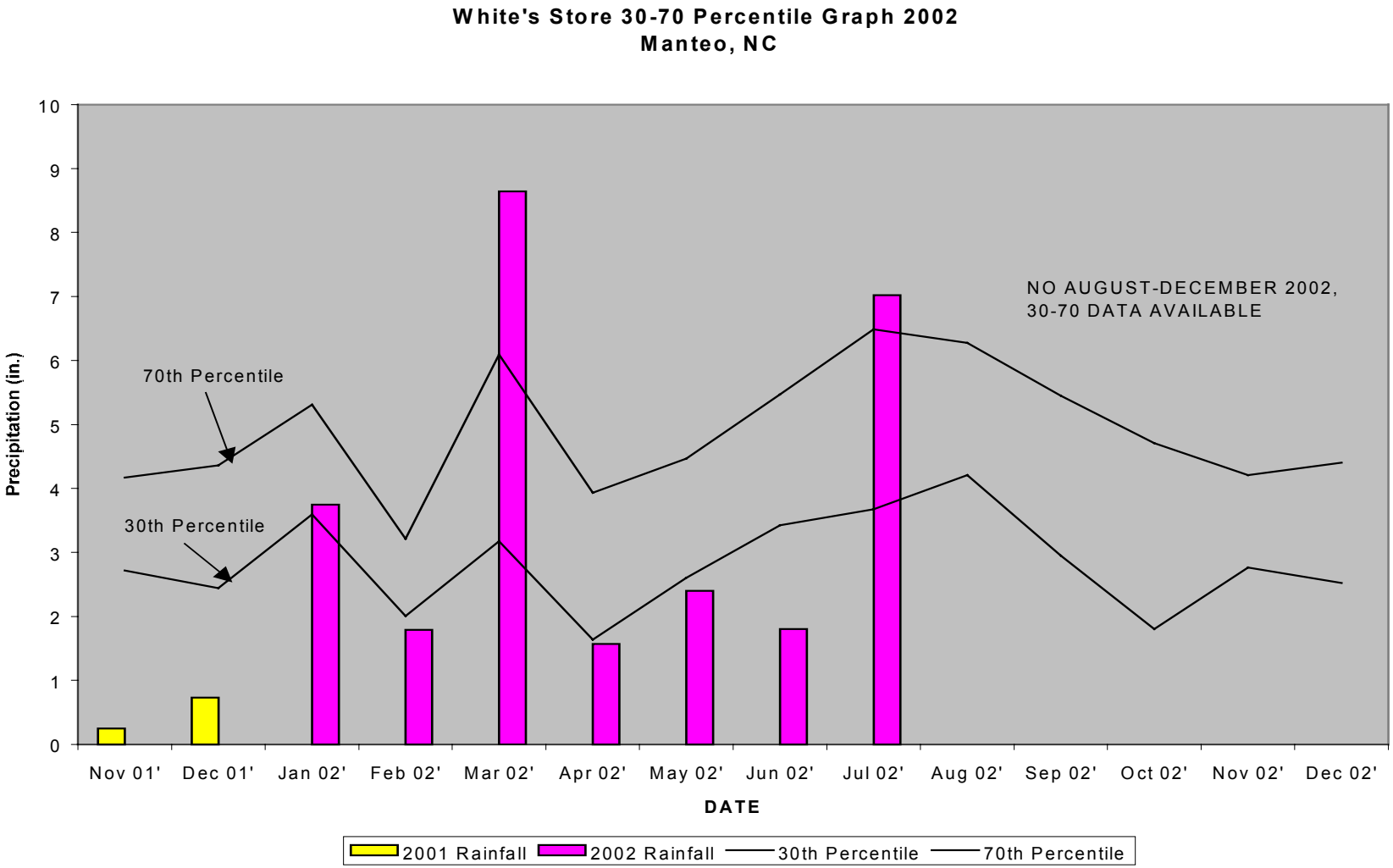


Figure 2. 30-70 Percentile Graph (Data from Manteo Airport, Dare County, NC)

3.0 VEGETATION

3.1 Success Criteria

The site will be considered a success if at the end of 5 years more than 50% of individual plants have survived and are growing or growth of planted species has achieved aerial coverage of at least 75% of the site.

3.2 Description of Species

The following was planted in the Wetland Restoration Area:

Cladium jamaicense, Sawgrass

3.3 Results of Vegetation Monitoring

Site was monitored in August 2002 and minimal planted vegetation was observed. Therefore, no values were calculated for frequency and percent cover.

3.4 Conclusions

The White's Store site does not currently meet the approved vegetation success criteria. NCDOT plans to conduct soil samples and further evaluate the vegetation failure experienced in 2002. Possible explanation of the lack of vegetation success may be due to problems with the soil present after excavation of the old road bed and/or soil compaction problems from the old road bed. NCDOT plans to perform soil tillage and custom fertilization based on NCDA soil analysis before re-planting. The site is scheduled to be replanted in May, 2003.

4.0 OVERALL CONCLUSIONS/ RECOMMENDATIONS

Both of the groundwater monitoring gauges installed on site indicated that the site was saturated within 12 inches of the surface for more than 12.5% of the growing season. Based upon the initial success of the site in meeting jurisdictional hydrologic criteria, NCDOT will continue hydrologic monitoring.

Adequate soil preparation and soil amendments will be accomplished prior to replanting. The site was replanted in May 2002, but monitoring conducted in August 2002 indicated minimal plant survival. The site will be re-evaluated and is scheduled to be replanted in 2003. Vegetation monitoring will begin again once the site has been replanted.

APPENDIX A

DEPTH TO GROUNDWATER PLOTS

APPENDIX B

SITE PHOTOS AND VEGETATION PLOT/ MONITORING GAUGE MAP

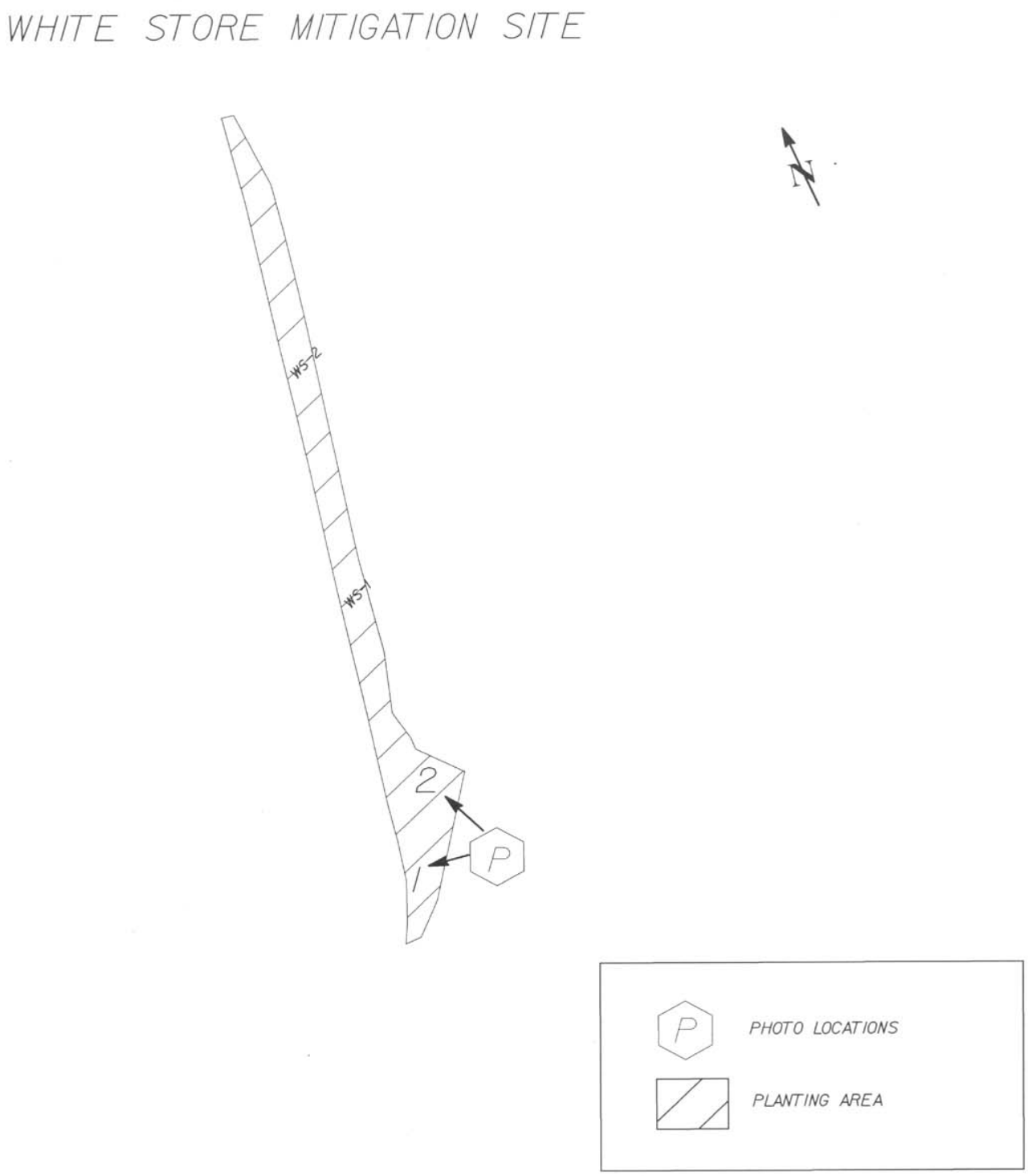
White Store

Photo 1

Photo 2

2002

White Store



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